

A HYBRID BETWEEN SHAGBARK AND BITTERNUT  
HICKORY IN SOUTHEASTERN VERMONT

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In the fall of 1944, while searching for sweet pignut south of Brattleboro, Vermont, I found a large tree whose 4-valved fruit looked like *Carya ovalis*. The bud-scales of one of four small trees at the base of the large one were, however, valvate as in *C. cordiformis*, but brown as in *C. ovalis*. This group of trees appears to be the hybrid  $\times$  *C. LANEYI* Sarg. var. *CHATEAUGAYENSIS* Sarg. between *C. cordiformis* and *C. ovata*, though it is very close to  $\times$  *C. Demareei* Palmer (Journ. Arn. Arb. **18**: 135-136, 1937), a hybrid between *C. ovalis* and *C. cordiformis*.

Collections have been made of fall condition, fruit, winter buds, opening buds, and early summer condition of the trees; a specimen has been deposited at the Arnold Arboretum.

The trees are growing on a rocky wooded hillside 60 feet above state road number 30 on its western side, 7 miles north of the Mass.-Vermont line, and 2 miles north of the dam at Vernon, Vermont. A large tree of characteristic *C. cordiformis* is growing 50 feet north of the hybrid, and a fallen one is close to the hybrid. A small tree of *C. ovata* is located about 300 ft. further north. No tree of *C. ovalis* was observed near by, but a thorough search has not been made; furthermore, many of the original trees have been removed by hurricane, fire, and cutting. Pignuts, probably *C. ovalis*, have been reported growing along the Connecticut River in Vermont as far north as Bellows Falls.

The central tree of the cluster is large, about 60 feet high, with rather flattened lower trunk, 12 inches diameter one way, 16 the other, this trunk forking 10 feet above the ground into two large trunks. The first horizontal branches are 20 feet above the ground. The bark of most of the upper part of the trunk is light gray and smooth; on the lower part it is slightly roughened with shallow diamond-shaped areas as in young trees of *Fraxinus americana* or in *C. cordiformis*. The four small trees around the larger one are probably root suckers from the main tree; the root of one of the former is clearly connected with a strong root of the larger tree.

The leaflets are usually 7 in number, occasionally 5, narrow, without tufts of hairs on the serrations such as those that occur



in *C. ovata*, essentially glabrous; small clusters of hairs occur frequently in the axils of the side veins on the lower surface, and scattered solitary hairs occur on some strong side veins. The terminal buds are much larger than the lateral ones, being about 9–12 mm. long, ovate-lanceolate, with a long drawn out point much as in *C. cordiformis*; this tip is frequently curved. The consistency and general shape of the outermost bud-scales still remaining by late August are much the same as in the bitternut hickory, but greenish brown in color, ovate-lanceolate, rather thick, barely acute, longer than the inner scales; one or both outer scales may fall off by November, exposing the finely grayish hairy inner scales. The outermost brown hardened bud-scales with narrow hairy tips found in *C. ovata* and *C. ovalis* are absent. There is a total of about six bud-scales; both inner and outer ones have few to several scattered yellow glands. The lateral buds are small, tight, greenish to yellowish brown, becoming shining chestnut brown, quite different in appearance from either *C. cordiformis* or *C. ovalis*. The bud-scales are valvate, coriaceous, the two exposed ones meeting along a line in front and back, frequently with a raised ridge at the junction of the bud-scales along the back of the bud. The bud-scales have several to many yellow glands on the surface, but the general color is not yellow. On some twigs in certain years when the terminal bud is absent because of development of flowers, the buds all seem small and chestnut brown, and the buds resemble those of  $\times$  *C. Demareei*. Opening lateral buds (in a pseudoterminal position) show usually two pairs of bud-scales, the outer ones persistent, remaining small and brown, the inner ones somewhat accrescent, becoming comparatively short, broad, rather thin, obtuse, green (up to 17–20 mm.  $\times$  4–7 mm.). The bud-scale scars, on branches developed from lateral buds, show two sets of opposite, comparatively high, essentially glabrous scars much as in *C. cordiformis*. Opening terminal buds were not observed; few terminal buds seemed to mature during the season of 1944, at least on the branches seen by the writer. Bud-scale scars on branches developed from terminal buds show about six scars, rather close, but each scar is distinct, comparatively high, much as in *C. cordiformis*, and not forming a ring of much crowded narrow indefinite lines as in *C. ovata*. The fruit is medium, 4-valved almost to the base, the valves rather thin, 1–1½ mm. thick,



rough, warty, somewhat wing-margined. The nut is rather ovate, flattened, not ridged or slightly ridged to near the base, rather truncate at base with a central depression, drawn out at the apex as in *C. cordiformis*, the shell somewhat thicker than that of this species (1 mm.) with a small cavity in each of the four dorsal internal ridges. The meat is corrugated as in that of *C. cordiformis*, and presumably bitter. This is to be expected, with a tree of *C. cordiformis* near by.

In the sweet pignut the outer bud-scale of the lateral buds is sac-like, probably formed by the fusion of two lateral scales, usually shorter than the bud, open in front or often at the top exposing the inner grayish tomentose scales; there are 3 or more "pairs" of scales, the outer persistent, the inner accrescent, becoming long, broad, thin, green. In the shagbark the lateral buds may be similar to those described for the pignut, or the inner bud-scales may be exposed, the outer bud-scales being much shorter than the bud; the bud-scales are strongly accrescent, becoming large, prominent and petaloid. In both the sweet pignut and the shagbark the nut lacks cavities in the shell or the outer parts of the partitions. In *C. cordiformis* there is usually only one pair of exposed yellow bud-scales, the bud-scales becoming in the spring rather elongate, narrow, recurved; the cross section of the nut shows a large dark brown cavity in each of the four dorsal internal ridges.

Thus the general aspect of the hybrid in spring and summer is that of *C. cordiformis*, with its smooth bark and 7 narrow leaflets, but the buds are not yellow. In the fall and winter the color of the buds and the roughness and dehiscence of the fruit resemble these features in *C. ovalis*, but the bud-scales are valvate, and the terminal buds are slender and long-pointed. In size the buds resemble those of *C. ovata*. The opening lateral buds are intermediate between the conditions in *C. ovata* or *C. ovalis* and *C. cordiformis*, but are nearer to those of the last species.

Previous collections of  $\times$  *C. Laneyi* and its variety *chateaugayensis*, as represented at the Arnold Arboretum, are from Summertown, Ontario; Chateaugay, Quebec; Rochester, N. Y.; Lancaster, Pa.; Millerstown, Pa.

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